

REMARKS

Applicant respectfully requests that the above-identified application be reconsidered.

An Office Action mailed on December 18, 2007 ("Office Action"), rejected Claims 1-17, 19, 24-38, 42-54, and 57-60. The Office Action rejected Claims 5-7, 35, and 51 under 35 U.S.C. § 112, second paragraph, as being indefinite. The Office Action also rejected Claims 1-3, 6-7, 9, 11, 13-15, 25-29, 33-35, 42-43, 47, 50, and 57 under 35 U.S.C. § 102(b) as being anticipated by the teachings of U.S. Patent No. 5,743,998, issued to Park. The Office Action also rejected Claims 2, 6-9, 11, 13-14, 26, 34, 35, 36, 38, 42-44, 47, 51, 52, 57, and 60 under 35 U.S.C. § 102(b) as being anticipated by the teachings of U.S. Patent No. 5,888,846, issued to Miyata et al. ("Miyata et al."). The Office Action also rejected Claims 3, 4-5, 16, 17, 45, 46, 48, 49, 58, and 59 under 35 U.S.C. § 103(a) as being unpatentable over Miyata et al. in view of the teachings of U.S. Patent No. 5,169,494, issued to Hashimoto et al. ("Hashimoto et al."). The Office Action further rejected Claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Miyata et al. in view of Japanese Patent No. 05-315298A, issued to Sato. The Office Action further rejected Claims 30-32 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Park in view of Miyata et al. The Office Action also rejected Claims 10, 12, 53, and 54 under 35 U.S.C. § 103(a) as being unpatentable over Miyata et al. in view of applicant's admission.

Claims 3, 6, 9, 10, 15, 18-27, 33-35, 39-41, 50-52, and 54-58 have been canceled. Claims 1, 2, 5, 8, 11-14, 16, 29-32, 36-38, 42, 49, 53, and 59-60 have been amended to more clearly recite the claimed subject matter and distinguish the claimed subject matter over cited and applied references. New Claims 61 and 62 have been added.

Rejection of Claims 5-7, 35, and 51 Under 35 U.S.C. § 112, Second Paragraph

As noted above, Claims 5-7, 35, and 51 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Also, as noted above, Claims 5 and 7 have been amended to

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obviate the rejection on this ground and Claims 6, 35, and 51 have been canceled. Accordingly, applicant respectfully requests that the rejections on this ground be withdrawn.

Rejection of Claims 1-3, 6, 7, 9, 11, 13-15, 25-29, 33-35, 40-42, 43, 47, 50, and 57 Under 35 U.S.C. § 102(b)

As noted above, the claims identified above in the present subsection were rejected under 35 U.S.C. § 102(b) as being anticipated by Park. Also, as noted above, Claims 3, 6, 9, 25-27, 33-35, 50, and 57 have been canceled, rendering their respective rejections moot. Claims 1, 2, 7, 11, 13-15, 29, 42-43, and 47 have been amended to more clearly distinguish the claimed subject matter over the cited and applied references. Accordingly, applicant respectfully disagrees with the rejection of the currently amended claims for the reasons set forth below.

Amended independent Claims 1 and 13 substantially recite similar features in relevant portions. As such, Claim 1 will be used as a representative claim to present arguments for allowability.

Amended independent Claim 1 recites, *inter alia*:

1. A surface processing method comprising the steps of:
 - (a) irradiating a surface of an SOG layer with an electron beam from an electron gun so as to expose at least part of the SOG layer; and
 - (b) removing all or part of the exposed parts of the SOG layer by etching;wherein a **magnitude of an accelerating voltage of the electron gun for the electron beam is changed according to an irradiation position of the electron beam** so that a depth of the exposed part of the SOG layer can be controlled.

(Emphasis added.)

Park does not disclose, teach, or even suggest that "a magnitude of an accelerating voltage of the electron gun for the electron beam is changed according to an irradiation position

of the electron beam . . ." as recited in amended Claim 1 (emphasis added). Park is directed to a process for "altering the susceptibility of a portion of a spin-on glass layer to etching." Park further discloses that:

. . . the process includes taking a substrate including a layer of positive or negative resist spin-on glass and exposing a portion of the spin-on glass layer to an electric field or an electron beam. Depending on the particular spin-on glass used, exposure of a portion of the spin-on glass layer to the electric field or electron beam causes the exposed portion to have either significantly enhanced or reduced susceptibility to etching as compared to the unexposed portion.

(Abstract.)

In Figure 3, Park discloses an electron beam tip 16 exposing a sample 20 to the electron beam. Park further discloses a DC bias voltage between the tip 16 and the sample 20. More specifically, Park discloses that "the electric fields and/or electron beam used may be formed by creating an electrical potential between an electron source and the conductive layer, the resist media being positioned between the electron source and the conductive layer." (Col. 8, lines 16-20; emphasis added.) Park further discloses that "a bias voltage is applied between the sample 20 and the tip 16 of the SPM probe 14. The electrical potential applied to the sample is controlled by changing the DC voltage that is applied from a control unit 26 which also controls the scanner." (Col. 8, lines 50-54; emphasis added.) Based on the descriptions quoted above and Figure 3, Park clearly discloses that the sample being exposed to the electron beam is placed between the electron beam and the conductive layer. Park discloses that "the sample 20 is electrically connected to the sample holder 18 with, for example, silver paste 22." (Col. 8, lines 46-48; emphasis added.) Therefore, the electron beam intensity or strength is controlled by changing the DC voltage across sample 20; that is, between tip 16 and sample holder 18. Those skilled in the art will appreciate that an electron beam intensity is controlled in an electron gun by an accelerating voltage enclosed within the electron gun and not controlled by a DC voltage

across the sample. More specifically, with respect to Figure 3 of Park, the variable DC voltage across sample 20 controls the intensity of the electron beam through tip 16. This is in contrast to amended independent Claim 1 reciting that a "magnitude of an accelerating voltage of the electron gun for the electron beam is changed" , thus, controlling the intensity of the electron beam (Emphasis added.)

Amended independent Claim 13 recites, in relevant portions, substantially the same features as discussed above with respect to amended Claim 1 and is submitted to be allowable for at least the same reasons discussed above with respect to amended Claim 1.

Amended independent Claim 42 recites, in relevant portions, substantially similar features as amended Claim 1 and is submitted to be allowable for at least the same reasons discussed above with respect to amended Claim 1.

Amended Claims 2 and 11, and Claims 14, 28, and 29, and Claims 43 and 47, depend from amended Claims 1, 13, and 42, respectively, and are submitted to be allowable for at least the same reasons discussed above with respect to amended Claims 1, 13, and 42.

Rejection of Claims 2, 6-9, 11, 13-14, 26, 34, 35, 36, 38, 42-44, 47, 51-52, 57, and 60 Under 35 U.S.C. § 102(b)

As noted above, the claims identified in the present subsection were rejected under 35 U.S.C. § 102(b) as being anticipated by Miyata et al. Applicant respectfully disagrees for the reasons set forth below.

As noted above, Claims 6, 9, 51, 52, and 57 have been canceled, rendering the rejection on this ground moot. Additionally, Claims 8, 11, 13, 14, 36, 38, 42-44, 47, and 60 have been amended to more clearly recite the claimed subject matter. Claims 2, 7, 8, and 11, Claims 14, 36, and 38, and Claims 43, 44, 47, and 60 depend from amended Claims 1, 13, and 42, respectively, and are submitted to be allowable for at least the same reasons discussed above with respect to

amended Claims 1, 13, and 42. Miyata et al. fails to supply the teachings missing from Park. Miyata et al. is directed toward a process and a method for microfabricating diamond. Miyata et al. discloses that the process includes "forming a resist layer composed of a ladder silicone spin-on glass material on the surface of diamond; performing lithography, in which the resist layer is irradiated with an electron beam or an ion beam in a given pattern; developing the resist layer to form the given pattern; and etching diamond by an ECR plasma etching method." (Abstract.) Miyata et al. further discloses, with respect to Figure 4, that "the ion beam is selectively radiated onto an area where the resist layer 6 is to remain. As a result, the ladder silicone SOG material in the area dehydrates and condenses to be insoluble in an organic solution." (Col. 6, lines 10-20.) Miyata et al. further discloses that "a pattern is formed by radiating an electron beam or an ion beam onto the resist layer, followed by etching the diamond by an ECR or high-frequency plasma etching method." (Col. 6, lines 40-44.) Miyata et al. does not disclose, teach, or even remotely suggest "a magnitude of an accelerating voltage of the electron gun for the electron beam is changed according to the radiation position of the electron beam." Therefore, amended Claims 2, 7, 8, 11, 13, 14, 36, 38, 42-44, 47, and 60 are submitted to be allowable for at least the reasons as discussed above.

Rejection of Claims 3, 4, 5, 16, 17, 45, 46, 48, 49, 58, and 59 Under 35 U.S.C. § 103(a)

As noted above, the Office Action rejected the claims identified in the present subsection under 35 U.S.C. § 103(a) as being unpatentable over Miyata et al. in view of Hashimoto et al. Applicant respectfully disagrees for the reasons set forth below.

As noted above, Claims 3 and 58 have been canceled, rendering the rejection on this ground moot. Additionally, also as noted above, Claims 5, 16, 45, 46, 48, 49, and 59 have been amended to more clearly recite the claimed subject matter. Claim 5, Claims 16 and 17, and Claims 45, 46, 48, 49, and 59 depend from amended Claims 1, 13, and 42, respectively, and are

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submitted to be allowable for at least the same reasons discussed above with respect to Claims 1, 13, and 42. Hashimoto et al. fails to supply the teachings from Park and Miyata et al. Hashimoto et al. is directed to a method of "forming a fine pattern comprising the steps of forming a semiconductor substrate an organic polymer film and heat treating it, forming on the organic polymer film an inorganic film and heat treating it . . . and etching the inorganic film and the organic polymer film using the resist pattern as a mask." (Abstract.) Hashimoto et al. does not disclose, teach, or even remotely suggest a "magnitude of an accelerating voltage of the electron gun for the electron beam is changed according to an irradiation position of the electron beam," as recited in amended Claims 1, 13, and 42. Therefore, Claim 17, and amended Claims 5, 16, 45, 46, 48, 49, and 59 are submitted to be allowable for at least the reasons discussed above.

Rejection of Claim 24 Under 35 U.S.C. § 103(a)

As noted above, Claim 24 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyata et al. in view of Sato. Applicant respectfully disagrees for the reasons set forth below.

As noted above, Claim 24 has been canceled, rendering the rejection on this ground moot.

Rejection of Claims 30-32 and 37 Under 35 U.S.C. § 103(a)

As noted above, Claims 30-32 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Park in view of Miyata et al. Applicant respectfully disagrees for the reasons set forth below.

As noted above, Claims 30-32 and 37 were amended to more clearly recite the claimed subject matter. Independent Claim 30 recites, in relevant portions, substantially similar features as recited in amended Claim 1 and is submitted to be allowable for at least the same reasons discussed above with respect to Claim 1.

Claims 31, 32, and 37 depend from amended Claim 30 and are submitted to be allowable for at least the same reasons discussed above with respect to Claim 30.

Rejection of Claims 10, 12, 53, and 54 Under 35 U.S.C. § 103(a)

As noted above, Claims 10, 12, 53, and 54 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyata et al. in view of applicant's admissions. Also, as noted above, Claims 10 and 54 have been canceled, rendering the rejection of these claims moot. Additionally, Claims 12 and 53 have been amended to more clearly recite the claimed subject matter. Claims 12 and 53 depend from amended Claims 1 and 42, respectively, and are submitted to be allowable for at least the same reasons discussed above with respect to Claims 1 and 42.

CONCLUSION

In summary, applicant respectfully submits that all of the claims pending in this application are clearly allowable in view of the disclosures of Park, Miyata et al., Hashimoto et al., and Sato, applied singly or in any motivated combination. As a result, applicant respectfully requests that all of the claims remaining in this application be allowed and this application be passed to issue.

Respectfully submitted,

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